

## LAB 1

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Develop a Java program that prints all real solutions to the quadratic equation  $ax^2+bx+c = 0$ . Read in a, b, c and use the quadratic formula. If the discriminate  $b^2-4ac$  is negative, display a message stating that there are no real solutions.

```
import java.util.*;

class Quad {
    Scanner sc = new Scanner(System.in);
    int a, b, c, d;
    double r1, r2, d_sq;

    void input() {
        System.out.println("Enter coefficients a,b,c:");
        a = sc.nextInt();
        b = sc.nextInt();
        c = sc.nextInt();
    }

    void calc() {
        int d = b * b - 4 * a * c;
        System.out.println(d);
        if (d == 0) {
            r1 = -b / (2.0 * a);
            System.out.println("Roots are real and equal");
            System.out.println("Root 1 = " + r1 + "\nRoot 2 = " + r1);
        } else if (d > 0) {
            d_sq = Math.sqrt(d);
            r1 = (-b + d_sq) / (2.0 * a);
            r2 = (-b - d_sq) / (2.0 * a);
            System.out.println("Roots are real and distinct");
            System.out.println("Root 1 = " + r1 + "\nRoot 2 = " + r2);
        } else {
            d_sq = Math.sqrt(-d);
            r1 = -b / (2.0 * a);
            r2 = d_sq / (2.0 * a);
            System.out.println("Roots are imaginary");
            System.out.println("Root 1 = " + r1 + " + " + r2 + "i" + "\nRoot 2 = " + r1 + " - " + r2 + "i");
        }
    }
}
```

```
    }  
  }  
}
```

```
class Quadratic {  
    public static void main(String[] args) {  
        System.out.println("Name: Abhinav C \nUSN: 1BM23CS008");  
        Quad quad = new Quad();  
        quad.input();  
        quad.calc();  
    }  
}
```

```
C:\Users\Admin\OneDrive\Desktop>javac Quadratic.java  
Name: Abhinav C  
USN: 1BM23CS008  
Enter coefficients a,b,c:  
1  
1  
1  
-3  
Roots are imaginary  
Root 1 = -0.5 + 0.8660254037844386i  
Root 2 = -0.5 - 0.8660254037844386i  
  
C:\Users\Admin\OneDrive\Desktop>java Quadratic  
Name: Abhinav C  
USN: 1BM23CS008  
Enter coefficients a,b,c:  
4  
12  
9  
0  
Roots are real and equal  
Root 1 = -1.5  
Root 2 = -1.5
```